

CA2 ON
EVR 125
A 369

AIR QUALITY ASSESSMENT
THUNDER BAY TERMINALS LIMITED
THUNDER BAY

1981



H. D. Griffin
Chief, Air Quality Assessment



TECHNICAL SUPPORT SECTION
NORTHWESTERN REGION
ONTARIO MINISTRY OF THE ENVIRONMENT

July, 1981

Copyright Provisions and Restrictions on Copying:

This Ontario Ministry of the Environment work is protected by Crown copyright (unless otherwise indicated), which is held by the Queen's Printer for Ontario. It may be reproduced for non-commercial purposes if credit is given and Crown copyright is acknowledged.

It may not be reproduced, in all or in part, for any commercial purpose except under a licence from the Queen's Printer for Ontario.

For information on reproducing Government of Ontario works, please contact ServiceOntario Publications at copyright@ontario.ca

INTRODUCTION

Since 1975, the Ontario Ministry of the Environment has undertaken pre- and post-operational air quality studies in the vicinity of a coal terminal operated by Thunder Bay Terminals Limited in Thunder Bay. First shipments of coal arrived at this facility in June, 1978.

All earlier Ministry reports showed that levels of dustfall and suspended particulate matter usually complied with Ontario's air quality objectives at all sampling sites around the project site. Commencement of coal shipments did not increase dust concentrations in the surrounding area and no effects could be found on local vegetation or soil. Snow sampling revealed that coal dust deposition was confined to the immediate vicinity of the coal storage area.

In 1981, air quality monitoring was restricted to a continuation of particulate matter measurements and collection of wind data.

AIR QUALITY MONITORING

DUSTFALL

Dustfall, comprising particulate matter which settles out from the air by gravity, was measured at the sites shown in Figure 1. Seven of the nine monitoring stations belong to a network operated by Thunder Bay Terminals Limited. Sites 9 (Kam Boating Club) and 10 (McKellar Hospital) are part of the Ministry's air quality monitoring network for Thunder Bay.

Dustfall for 1981 is summarized in Table 1. Except for a single sample at site 10 (McKellar Hospital), dustfall measurements complied with Ontario's objectives (7 g/m^2 for 30 days and

4.6 g/m², annual average) at all locations off Thunder Bay Terminals and Ontario Hydro property. Elevated readings at sites 4 to 7 were caused primarily by road dust and insect debris, with fly ash also contributing to dustfall in May and November at Ontario Hydro (Site 4).

Comparison between average dustfall from 1976 to 1981 (Table 2) shows no increase in fallout of particulate matter at the four sites off Thunder Bay Terminals property following commencement of coal shipments in mid 1978. For this reason, the Ministry decided that monitoring could be reduced, while still providing information which was fully adequate to document local air quality. Accordingly, dustfall measurement at sites 2, 4 and 5 was terminated on December 31, 1981.

SUSPENDED PARTICULATE MATTER

Suspended particulate matter comprises dust particles of small size and is measured with a high volume sampler for a 24 hour period every sixth day.

The 1981 data are presented in Table 3 for the three Thunder Bay Terminals sites (sites 1-3) and the Ministry's monitoring location (site 10). The 24 hour objective for suspended particulate matter (120 µg/m³) was slightly exceeded six times at site 2 (Shell Oil Terminal), three times at site 10, only once at site 3 (Thunder Bay Terminals) and not at all at site 1 (Sewage Treatment Plant). None of these exceedences was ascribed to operations at Thunder Bay Terminals. Most of the elevated readings occurred during spring months, when the presence of road dust commonly results in above average dust concentrations. The annual average air quality objective of 60 µg/m³ was met at all sites in 1981 as it was in preceding years. It is interesting to note that the average for site 3 (Thunder Bay Terminals) was the second lowest of the four monitoring stations. A 6 year summary of data (Table 4) shows that levels of suspended particulate matter did

not increase following start-up of operations at Thunder Bay Terminals. Because of this satisfactory situation, it was decided that high volume sampling could be discontinued at one location (site 2) at the end of 1981.

CONCLUSIONS

Air quality monitoring during the third full year of operations at Thunder Bay Terminals Limited indicated that dust concentrations in the vicinity of this facility continued to be recorded at satisfactory levels. Since air quality objectives have been consistently achieved at all off-property locations during this period, a reduction in the monitoring programme was implemented at the end of 1981. Measurements of dustfall, suspended particulate matter and wind are to be continued at the remaining sites (dustfall at sites 1, 3, 6, 7, 9 and 10; suspended particulate matter at sites 1, 3 and 10) to ensure ongoing compliance with provincial air quality regulations.

ACKNOWLEDGEMENT

The Ministry is grateful to Thunder Bay Terminals Limited for providing data on wind measurements, dustfall and suspended particulate matter from their monitoring network.

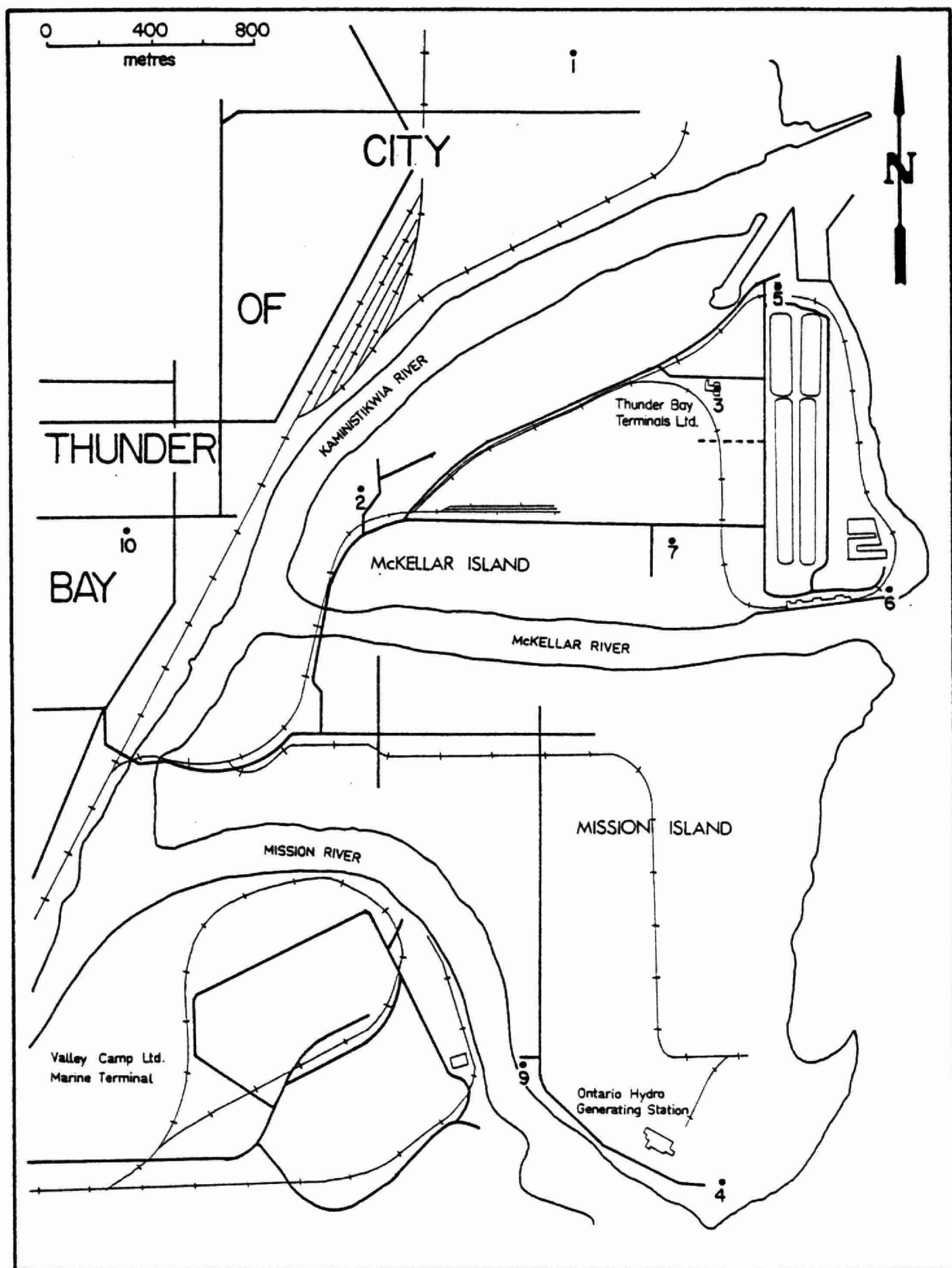


Figure 1. Air quality monitoring sites, 1981.

TABLE 1. Dustfall (g/m²/30 days) in the vicinity of Thunder Bay Terminals Limited and Ontario Hydro, 1981.

Site	Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
1	Sewage Treatment Plant	0.7	0.6	1.3	4.1	3.1	5.6	2.3	1.4	3.2	1.4	0.8	1.0	2.1
2	Shell Oil Terminal	1.4	1.0	2.1	6.9	3.8	5.2	3.1	3.4	5.0	1.8	1.2	<0.1	2.9
3	Thunder Bay Terminals	1.3	1.5	2.2	<u>7.6</u> ^a	4.7	5.5	3.9	3.0	3.4	2.4	2.0	5.5	3.6
4	Ontario Hydro	5.5	2.8	2.8	4.9	<u>44.0</u>	7.8	4.0	2.3	5.8	3.2	<u>15.4</u>	<u>7.1</u>	<u>8.8</u>
5	Thunder Bay Terminals	0.7	0.6	1.0	4.6	<u>12.4</u>	<u>8.4</u>	3.7	2.9	5.3	-	3.3	1.0	4.0
6	Thunder Bay Terminals	1.6	1.0	3.2	2.4	3.5	<u>35.2</u>	<u>13.3</u>	5.1	3.3	-	6.4	0.9	<u>6.9</u>
7	Thunder Bay Terminals	0.7	0.7	1.7	3.1	2.7	6.3	1.4	1.0	3.0	-	1.4	<u>25.1</u>	4.3
9	Kam Boating Club	1.1	1.4	1.1	2.3	4.4	4.4	2.8	2.4	2.1	1.0	1.7	0.8	2.1
10	McKellar Hospital	1.3	2.4	4.4	<u>9.2</u>	6.4	6.9	2.1	3.1	1.9	2.2	2.2	2.0	3.7

^aValues exceeding maximum acceptable levels of 7.0 (monthly) or 4.6 (annual average) are underlined.

TABLE 2. Average annual dustfall ($\text{g}/\text{m}^2/30$ days) in the vicinity of Thunder Bay Terminals Limited and Ontario Hydro, 1976-1981.

Site	Location	1976	1977	1978	1979	1980	1981
1	Sewage Treatment Plant	3.2	4.4	3.2	2.8	2.5	2.1
2	Shell Oil Terminal	4.2	<u>8.4</u> ^a	<u>5.1</u>	3.7	4.2	2.9
3	Thunder Bay Terminals	4.2	4.2	2.7	2.7	<u>5.2</u>	3.6
4	Ontario Hydro (SE)	4.2	<u>11.5</u>	<u>7.4</u>	<u>5.9</u>	<u>6.8</u>	<u>8.8</u>
5	Thunder Bay Terminals					3.9	4.0
6	Thunder Bay Terminals					<u>8.5</u>	<u>6.9</u>
7	Thunder Bay Terminals					<u>7.9</u>	4.3
9	Kam Boating Club	<u>5.6</u>	4.6	4.3	4.2	2.5	2.1
10	McKellar Hospital	3.5	<u>5.0</u>	3.8	3.8	4.0	3.7

^aValues exceeding maximum acceptable levels of 4.6 are underlined.

TABLE 3. Concentrations of total suspended particulate matter ($\mu\text{g}/\text{m}^3$) in the vicinity of Thunder Bay Terminals Limited, 1981.

Date	Sampling site				Date	Sampling site			
	1	2	3	10		1	2	3	10
Jan 4	12	19	5	31	Jul 3	37	101	<u>146</u>	29
10	11	14	19	20	9	77	-	<u>73</u>	71
16	14	25	33	23	15	51	-		69
22	18	20	34	22	21	37	36	83	37
28	20	18	29	-	27	48	104	61	50
Feb 3	15	19	30	27	Aug 2	37	<u>152</u>	46	53
9	18	17	27	79	8	20	<u>84</u>	51	38
15	74	76	82	79	14	71	106	69	94
21	26	30	23	49	20	68	106	67	77
27	23	13	18	37	26	67	<u>152</u>	81	83
Mar 5	14	29	35	63	Sep 1	16	79	19	25
11	54	33	24	68	7	24	<u>150</u>	27	22
17	40	63	59	57	13	36	<u>20</u>	77	47
23	28	59	18	67	19	27	59	24	42
29	33	36	-	37	25	35	20	41	48
Apr 4	29	30	35	45	Oct 1	13	15	5	21
10	104	<u>138</u> ^a	105	<u>127</u>	7	50	31	37	42
16	-	<u>153</u>	70	<u>167</u>	13	44	35	37	57
22	-	<u>105</u>	62	<u>38</u>	19	14	31	23	-
28	42	77	66	81	25	36	36	30	36
					31	37	45	36	63
May 4	24	30	27	62	Nov 6	34	63	62	64
10	28	33	33	47	12	43	24	30	81
16	48	97	53	73	18	-	41	29	39
22	62	<u>129</u>	81	<u>178</u>	24	40	53	47	101
28	64	<u>99</u>	68	<u>101</u>	30	57	25	60	45
Jun 3	54	66	60	75	Dec 6	38	17	36	59
9	24	33	27	44	12	49	33	62	91
15	46	50	29	90	18	13	45	43	36
21	30	32	26	49	24	5	19	38	26
27	43	90	44	62	30	6	9	18	33
Annual geometric means:						31	43	39	52

^aValues exceeding maximum acceptable level of $120 \mu\text{g}/\text{m}^3$ (24-hour average) are underlined.

TABLE 4. Annual geometric means of total suspended particulate matter ($\mu\text{g}/\text{m}^3$) in the vicinity of Thunder Bay Terminals Limited, 1976-1981.

Site	Location	1976	1977	1978	1979	1980	1981
1	Sewage Treatment Plant	41	31	27	30	28	31
2	Shell Oil Terminal	<u>61</u> ^a	60	48	41	36	43
3	Thunder Bay Terminals	47	33	34	33	33	39
10	McKellar Hospital	49	36	44	51	44	52

^aValues exceeding maximum acceptable levels of $60 \mu\text{g}/\text{m}^3$ (annual geometric mean) are underlined.

DISTRIBUTION LIST

Report on: Air quality assessment, Thunder Bay Terminals Limited,
Thunder Bay, 1981

Northwestern Region: Director.
Manager, Tech. Support
Manager, Industrial Abatement.
District Officer, Industrial Abatement,
Thunder Bay.
Chief, Regional Laboratory.

Laboratory Services Branch: Director.
Manager, Inorganic Trace Contaminants Section.
Air Quality Supervisor.

Air Resources Branch: Director.
Supervisor, Air Quality & Meteorology Section.

Information Services Branch: Main Library (N. J. McIlroy).

City of Thunder Bay: Clerk.

Thunder Bay Terminals Limited: Vice Pres. & Gen. Manager (N. H. Carr).

Thunder Bay Testing Limited: A. Martinuzzi.

Ontario Hydro: Superintendent, Chemical, Fuels and Environment (H. Borland).
Supervisor, Environmental Studies (C. D. Burnham).

Valley Camp Limited: Terminal Manager (G. F. Killins).

Port of Gothenburg: Planning Manager (B. Weide).

Chronicle Journal/Times News: Editor.

CBQ Radio: Senior News Editor

EMDJT

